Appl. No.: 10/808,692
Amdt.dated 02/15/2006
Reply to Office action of 11/15/2005

REMARKS/ARGUMENTS

Claim 5 has been amended as suggested by the Examiner. New Claims 13 and 14 are directed to properties of a film prepared from the composition of Claim 1. New independent Claim 15 is directed to an embodiment of the claimed invention wherein the composition is in the form of a coating liquid. These claim amendments and supported by the specification, for example at pages 25-26, and Applicant requests entry of these amendments.

The claimed invention is directed to a coating liquid that can be used to form a porous film. The liquid coating can be applied to a substrate to form a film having a desired thickness. The composition comprises an organic solvent and a condensation product of a silicate and/or organosilicate having specific formulas. The resulting film has superb mechanical strength and excellent dielectric properties, and is particularly useful in semiconductor manufacturing processes.

Claims 1 – 5 have been rejected under 35 U.S.C § 103(a) as being unpatentable over the combination U.S. Patent Publication No. 2002/0155053 to Nishiyama and U.S. Patent No. 6,632,489 to Watanabe.

Nishiyama describes a mesoporous silica material and composite having superior alkali resistance that can be used to form a separation membrane or a catalytic support. The mesoporous material contains a Zr element in the form of a Si-O-Zr bond. Nishiyama further describes a process for producing a filmy mesoporous silica in which a porous substrate is dipped in a solution containing a Si source and a Zr source followed by adding the porous substrate along with the solution to a second solution that contains a surfactant and a pH adjusting agent. The pH adjusting agent can be either a base or an acid, e.g., sodium hydroxide or sulfuric acid. See paragraphs 0029 and 0030. The resulting mixture is stirred to form a gel. The gel and the porous substrate are placed in a pressure vessel for a predetermined time and then removed and calcination is conducted to obtain a mesoporous silica film deposited on the porous substrate. The gel can also be used to form a calcined structure.

Watanabe describes a silica sol having a SiO_2 concentration of 1 to 50 wt% and containing liquid-medium dispersed moniliform colloidal silica particles. The silica sol is characterized in that the colloidal silica particles are linked in rows in only one plane and that the

particles are moniliform. The silica sol can be used for forming films and to provide a coating composition for ink jet printing.

Establishing a *prime facie* case of obviousness based upon a combination of reference teachings requires there to be some suggestion or motivation for the proposed combination or modification of reference teachings. The cited references fail to provide this suggestion or motivation.

The Office Action states that the motivation for the proposed combination comes from the desire to form an ink that can be applied by an ink jet printer. However, there is no disclosure or suggestion in the references themselves to provide any motivation to modify the gel of Nishiyama in view of Watanabe's teachings. As discussed above, Nishiyama is directed to a gel for forming an alkali resistant film or structure. Watanabe on the other hand, is directed to a sol that is used in ink jet printing. It is clear that the references are directed to two totally unrelated objectives and do not contain the necessary nexus to motivate a combination of teachings. The objectives and aims of the references are unrelated to one another. Therefore, there is no proper basis for the combination of reference teachings. The only possible suggestion of using an organic solvent in the silica composition described in Nishiyama comes from Applicants' own disclosure, which is impermissible.

Further, Watanabe actually teaches away from the silica composition described in Nishiyama. Watanabe describes a moniliform structure in which the silica particles are linked in rows in only a single plane and have large mean pore diameters on the order of 20 to 80 nm. See column 16, lines 35-37. Watanabe further states that in ink jet printing applications, silica compositions having small pore diameters are undesirable because the "amount of vacant space is too small to absorb ink sufficiently." See column 3, lines 16-20. In contrast to the larger pore diameters described in Watanabe, the silica composition described in Nishiyama has pore diameters on the order of 1 to 3 nm, which is significantly less than the pore diameters described in Watanabe. As a result, the pore diameters described in Nishiyama are too small to sufficiently absorb ink, and one of ordinary skill in the art would therefore not be motivated to use the silica composition described in Nishiyama in ink jet printing because the resulting film would be unsatisfactory for ink jet printing.

Because there is no teaching or motivation, within the cited references, to combine the disclosure of Watanabe with that of Nishiyama, the Office has failed to establish a *prima facie* case of obviousness and the pending rejections under 35 U.S.C. §103 should be withdrawn.

New Claims 13 and 14 are directed to improved mechanic and dielectric properties that are obtainable with the claimed invention. New Claims 13 and 14 are dependent on Claim 1 and are also patentable over the cited references for the reasons stated above. New Claim 15 is directed to a coating liquid that comprises the condensation product and an organic solvent as recited in Claim 1. Neither Nishiyama nor Watanabe describe a silica composition that is in the form of a coating liquid. In particular, Nishiyama describes two forms of mesoporous silicas, a particulate and a film, which are produced through the formation of a gel. Nishiyama states:

> In this process, it is important in order to obtain a filmly mesoporous silica that the porous substrate is beforehand dipped in the solution or dispersion containing a Si source and a Zi source. When the porous substrate is not dipped beforehand in the solution or dispersion containing a Si source and a Zr source, only particles of mesoporous silica are formed and no mesoporous silica film is formed on the porous substrate.

See paragraph 0023.

Thus, the mesoporous silica composition of Nishiyama cannot be used as coating liquid because of the formation of the gel. In order to form a film, the mesoporous silica gel has to be formed directly on the porous substrate and cannot be selectively coated onto the substrate. Otherwise, only mesoporous silica powder is obtained. In sharp contrast, the claimed invention recites a coating liquid. The coating liquid permits the film to be selectively applied to a substrate and also "provides a thin film having the desirably controlled film thickness using conventional methods of semiconductor processing." See paragraph 0024. Such control in thickness is not achievable with the silica gel composition described in Nishiyama. Furthermore, Watanabe does not disclose or suggest the subject matter of Claim 15. Therefore, Claim 15 is patentable over the cited references.

In view of the remarks made above, Applicant submits that the rejection under 35 U.S.C. § 103 have been overcome and that the pending claims are in condition for allowance. Applicant

Appl. No.: 10/808,692
Amdt.dated 02/15/2006
Reply to Office action of 11/15/2005

respectfully requests that the claims be allowed to issue. If the Examiner wishes to discuss the application or the comments herein, the Examiner is urged to contact the undersigned by telephone.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

Timothy J. Balts
Registration No. 51,429

Customer No. 00826
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111
CLT01/4770219v1

CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to the U. S. Patent and Trademark Office at Fax No. (571) 273-8300 on the date shown below.

Grace R. Rippy

February 15, 2006
Date